

# Leveraging Enterprise Budgets to Calculate Breakeven Points

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## Overview

Enterprise budgets are valuable resources to producers. They contain estimates of potential revenues, expenses, and earnings for an agricultural enterprise. An agricultural enterprise can be defined as any business that is primarily engaged in agriculture (e.g. a farmer that grows and markets rice or soybeans in Arkansas). Understanding the information within an enterprise budget and how to utilize it for farm planning is fundamental in on-farm decision-making. Conventionally, an enterprise budget is based on one acre for one crop (one head in the case of livestock) in one year. Consider budgets as small feasibility studies helping make planting, purchasing, and marketing decisions wherein a producer can adjust prices, yields, rates, etc., to reflect their practices and current market conditions. Each budget is specifically tailored to a system of production, inputs, and operations and summarizes the associated costs and returns. These resources assist in estimating breakeven prices or yields and enterprise planning (hence the name “enterprise” budgets).

## Components of an Enterprise Budget

An enterprise budget contains

several pieces of information, all aimed at capturing current market conditions and crop-specific sequences of operations (UADA-CES, 2024). Regardless of who developed the enterprise budget, it contains four important components: income (revenue), direct expenses (also known as variable or operating expenses), fixed (ownership) expenses, and profit (Wantoch and Bernhardt, 2022). Luckily, enterprise budget software, such as Excel spreadsheets, allow for quick and easy alternative calculations (Sahs and Bir, 2022). The University of Arkansas hosts enterprise budgets tailored to Arkansas crops and practices, usually released in the fall before next year’s crop. For instance, 2024 budgets for field crops planted in Spring 2024 have an expected release date of Fall 2023. For more information on enterprise budget software and best practices, contact your local Extension office or Breana J. Watkins at [bjwatkins@uada.edu](mailto:bjwatkins@uada.edu).

## Income (Revenue)

The first budget item listed is revenue, or income. Income for field crops is calculated as the total quantity of units sold multiplied by the selling price per unit (See Figure 1). For instance, 60 bushels of conventional soybeans sold at \$13/bushel gives an expected revenue of

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**Figure 1. 2024 Conventional Soybean Enterprise Budget Revenue.**

ARKANSAS SOYBEAN PROMOTION BOARD		Estimated Costs and Returns per Acre Conventional Soybean Furrow Irrigated, 12 ac-in., Arkansas, 2024				U of A DIVISION OF AGRICULTURE RESEARCH & EXTENSION University of Arkansas System		
ITEM	UNIT	PRICE	QUANTITY	Total Amount	Landlord Share %	Landlord Share	Tenant Share	
<b>INCOME</b>								
Soybean	bu	\$ 13.00	60	\$ 780.00	0.0%	\$ -	\$ 780.00	
<b>TOTAL INCOME</b>				\$ 780.00		\$ -	\$ 780.00	

**Figure 2. 2024 Conventional Soybean Enterprise Budget Revenue, 25% Crop Share.**

ARKANSAS SOYBEAN PROMOTION BOARD		Estimated Costs and Returns per Acre Conventional Soybean Furrow Irrigated, 12 ac-in., Arkansas, 2024				U of A DIVISION OF AGRICULTURE RESEARCH & EXTENSION University of Arkansas System		
ITEM	UNIT	PRICE	QUANTITY	Total Amount	Landlord Share %	Landlord Share	Tenant Share	
<b>INCOME</b>								
Soybean	bu	\$ 13.00	60	\$ 780.00	25.0%	\$195.00	\$ 585.00	
<b>TOTAL INCOME</b>				\$ 780.00		\$195.00	\$ 585.00	

\$780 per acre (60 bushels/acre X \$13/bushel).

A survey of local elevator forward cash price bids is taken each fall, and additional price data is gathered from August to November based on forward contracts for September 2024 (ZRU24) rough rice futures. Corn, grain sorghum, and cotton prices are derived from December 2024 (ZCZ24 and CTZ24) futures, and soybeans are priced from November 2024 (ZSX24) futures. The collected price data based on local forward cash price bids are then averaged and used as the expected price. Expected yields utilized in the budgets are an average of yields from the Arkansas Row Crop Verification Program. The on-farm practices utilized in the verification program are the practices assumed when developing the Arkansas Crop Enterprise Budgets.

For producers renting farmland, a rent expense is typically deducted from the total income in the form of a crop share. A 25% crop share (reducing total crop value by 25% as payment from tenant to land-owner) is a common rental agreement in Arkansas. Consider the previous example where a producer sold 60 bushels per acre and retained 100% of the revenue. Under a 25% crop share, the producer's soybean revenue is now 45 bushels of soybeans (60 bushels \* 0.75 = 45 bushels) at \$13/bushel. Under this crop share, the producer has a total revenue of \$585 to cover expenses; In other words, a producer has 75% of the total revenue to cover 100% of the expenses (see Figure 2).

## Direct (Operating) Expenses

Total operating expenses are the total of all production expenses incurred when planting a

crop, given the listed field activities (See Figure 3). For each Arkansas crop enterprise budget, a list of best practices is developed and updated regularly by agronomists, economists, weed scientists, entomologists, pathologists, and crop specialists within the University of Arkansas System Division of Agriculture. These field activities are located within each budget Excel file to give users the basis for each budget's development. Total production expense encompasses expected costs associated with each crop and irrigation type from pre-plant applications through post-harvest.

Pricing for Arkansas budgets is primarily sourced by surveying local dealers and suppliers of crop protectants, fuel, fertilizer, seed, and farm equipment (new, used and rental), among other items. If prices are unavailable locally, then online retailers, regional crop budget data, and last-sold prices are utilized.

## Fixed Expenses and Returns (Profit)

Fixed expenses are expected costs incurred even if a crop is not planted for the current crop season. Fixed expenses are items such as implements and equipment, power units and equipment used in irrigation, as well as buildings such as a shed or shop. It's important to note that fixed expenses could be cash (taxes, insurance, interest payments) or non-cash (depreciation and interest on invested money). Any expenditures involved in building and maintaining a shed, shop, etc. are not currently incorporated into enterprise budgets for Arkansas. However, many producers utilize these buildings, and it is likely to be a fixed expense to consider. Any expenses incurred by users can be added to the budget under direct expenses. In the 2024 crop enterprise budget for conventional soybeans, fixed expenses totaled \$94.97/acre (See Figure 4). The fixed expense portion of farm machinery and equipment utilizes formulas standard for agricultural engineers to estimate the total cash needed to replace equipment used each season. The budget assumes producers would be setting aside, or saving, this cash to replace equipment as needed at the end of its life usage. Most equipment has a life of 8 years for depreciation purposes. The depreciation is set at 7 years with only partial depreciation in the first and last year making it 8 total depreciation years (IRS, 2023).

Figure 3. 2024 Arkansas Conventional Soybean, Operating Expenses.

<b>DIRECT EXPENSES</b>							
<b>LAND EXPENSE</b>							
Cash Land Rent	acre			\$ -			\$ -
<b>SEED/PLANTS</b>							
Soybean Seed	thous	\$0.38	150	\$57.00	0.0%	\$ -	\$57.00
<b>CUSTOM SPRAY AND FERTILIZER</b>							
Ground App <sup>1,2,3,4,5</sup>	appl	\$8.00	6	\$48.00	0.0%	\$ -	\$48.00
Aerial App Chem <sup>6</sup>	appl	\$8.50	2	\$17.00	0.0%	\$ -	\$17.00
Aerial App Fert <sup>7</sup>	lbs	\$0.085	0	\$ -	0.0%	\$ -	\$ -
<b>FERTILIZERS</b>							
Phosphate (0-46-0) <sup>2</sup>	lbs	\$0.35	90	\$31.50	0.0%	\$ -	\$31.50
Potash (0-0-60) <sup>2</sup>	lbs	\$0.25	100	\$25.00	0.0%	\$ -	\$25.00
Urea (46-0-0) <sup>2,4,7</sup>	lbs	\$0.25	0	\$ -	0.0%	\$ -	\$ -
<b>HERBICIDES</b>							
Glyphosate <sup>1</sup>	oz	\$0.34	32	\$10.88	0.0%	\$ -	\$10.88
2,4-D <sup>1</sup>	oz	\$0.21	32	\$6.72	0.0%	\$ -	\$6.72
Boundary <sup>3</sup>	qt	\$23.50	1	\$23.50	0.0%	\$ -	\$23.50
Select Max <sup>5</sup>	pt	\$13.86	1	\$13.86	0.0%	\$ -	\$13.86
Zidua SC <sup>5</sup>	oz	\$6.20	3.5	\$21.70	0.0%	\$ -	\$21.70
Flexstar <sup>5</sup>	oz	\$0.62	1.5	\$0.93	0.0%	\$ -	\$0.93
Outlook <sup>5</sup>	oz	\$0.92	12.8	\$11.78	0.0%	\$ -	\$11.78
Gramoxone <sup>5</sup>	oz	\$0.37	32	\$11.84	0.0%	\$ -	\$11.84
First Rate <sup>5</sup>	oz	\$37.79	0.3	\$11.34	0.0%	\$ -	\$11.34
Python <sup>5</sup>	oz	\$20.47	0.5	\$10.24	0.0%	\$ -	\$10.24
<b>INSECTICIDES</b>							
Besiege <sup>6</sup>	oz	\$2.75	9	\$24.75	0.0%	\$ -	\$24.75
<b>FUNGICIDES ADJUVANTS HAULING</b>							
Haul Soybean	bu	\$0.27	60	\$16.20	0.0%	\$ -	\$16.20
<b>DRYING SUPPLIES</b>							
Polypipe	acre	\$3.88	1	\$3.88	0.0%	\$ -	\$3.88
<b>CROP CONSULTANT/SCOUTING FEE</b>							
Soybean Consultant	acre	\$6.50	1	\$6.50	0.0%	\$ -	\$6.50
<b>CROP INSURANCE</b>							
Soybean Crop Insurance	acre	\$4.80	1	\$4.80	0.0%	\$ -	\$4.80
<b>OPERATOR LABOR</b>							
Tractors	hour	\$16.54	0.3601	\$5.96	0.0%	\$ -	\$5.96
Harvesters	hour	\$16.54	0.0851	\$1.41	0.0%	\$ -	\$1.41
<b>IRRIGATE LABOR</b>							
Special Labor	hour	\$13.50	0.3625	\$4.89	0.0%	\$ -	\$4.89
<b>DIESEL FUEL</b>							
Tractors	gal	\$3.65	3.488	\$12.73	0.0%	\$ -	\$12.73
Harvesters	gal	\$3.65	2.027	\$7.40	0.0%	\$ -	\$7.40
Furrow Irr.	Ac-In	\$5.32	12	\$63.84	0.0%	\$ -	\$63.84
<b>REPAIR &amp; MAINTENANCE</b>							
Tractors/Implements**	acre	\$7.65	1	\$7.65	0.0%	\$ -	\$7.65
Harvesters	acre	\$7.76	1	\$7.76	0.0%	\$ -	\$7.76
Furrow Irr.	acre	\$0.24	12	\$2.88	0.0%	\$ -	\$2.88
INTEREST ON OP. CAP.	acre	\$19.79	1	\$19.79	0.0%	\$ -	\$19.79
<b>TOTAL DIRECT EXPENSES</b>				\$491.73		\$ -	\$491.73
<b>RETURNS ABOVE DIRECT EXPENSES</b>				\$288.27		\$ -	\$288.27

Figure 4. 2024 Conventional Soybeans, Fixed Expenses and Profit.

FIXED EXPENSES								
Tractors/Implements	acre	\$ 44.44	1	\$	44.44	0.0%	\$ -	\$ 44.44
Harvesters	acre	\$ 29.36	1	\$	29.36	0.0%	\$ -	\$ 29.36
Furrow Irr.	acre	\$ 21.17	1	\$	21.17	0.0%	\$ -	\$ 21.17
<b>TOTAL FIXED EXPENSES</b>				\$	94.97		\$ -	\$ 94.97
<b>TOTAL SPECIFIED EXPENSES</b>				\$	586.70		\$ -	\$ 586.70
<b>RETURNS ABOVE TOTAL SPECIFIED EXPENSES</b>				\$	193.30		\$ -	\$ 193.30

Profit per acre can then be calculated for conventional soybeans using revenue, operating, and fixed expenses. Total profit per acre of \$193.30 (assuming no crop share) is calculated as total revenue – total expenses (operating + fixed) or \$193.30 = \$780 – \$586.70 (See Figure 4).

## Breakeven Analysis as a Tool

Breakeven analysis weighs your income relative to costs (Roach and Milhollin, 2020). Put another way, breakeven analysis is the price (or yield) point in which income = expenses. In breakeven analysis, expenses refer to operating expenses used in the production of commodities (i.e., not including fixed costs). Fixed costs are not considered since, in the short run, these expenses are already paid or incurred regardless of production level, and, in line with economic theory, if operating expenses are not covered then fixed expenses cannot be covered either. A producer may choose to include fixed costs in breakeven calculations depending on their personal risk preferences. However, this fact sheet only considers operating expenses. The following examples were derived from the 2024 conventional soybean furrow-irrigated budget for Arkansas but can be applied to any crop.

## Breakeven Price

Calculating a breakeven price allows for improved crop marketing. For example, a producer may expect a certain yield per acre based on data from their farm. Using this data, they can estimate the minimum price needed to cover operating expenses on that acre. While the producer may not be certain about expected yield per acre, the analysis provides a good estimate of what to expect as they begin marketing plans. For this example, assume a producer has an

expected yield of 55 bushels per acre and incurs \$492 in operating cost per acre:

Recall that breakeven pertains to the following equation:

$$(\text{Price} \times \text{Yield}) = \text{Operating Cost}$$

To calculate a breakeven price, we're interested in solving for the unknown variable, price:

$$(\text{Price}_{\text{Breakeven}} \times 55 \text{ bu}) = \$492$$

Restructuring this equation gives us:

$$\frac{\text{Operating Cost}}{\text{Yield}} = \text{Price}_{\text{Breakeven}} \rightarrow$$

$$\frac{\$492}{55 \text{ bu}} = \$8.95$$

Operating costs per acre divided by yield per acre derives our expected breakeven price per acre of \$8.95 per bushel. This is the minimum expected dollar amount needed to cover operating expenses of their soybean enterprise. Again, a producer may choose to include fixed costs in addition to operating costs if they are more risk averse. This can be done simply by adding a fixed cost per acre to existing operating costs per acre in the above equation.

## Breakeven Yield

Breakeven yield is the number of bushels (or pounds) a producer must receive to cover operating costs at a given price. For example, consider a producer who forward contracts their crop production and is committed to delivering bushels at a certain price. Breakeven analysis can help determine the minimum number of bushels per acre needed to cover expected operating expenses at that price.

Producers can also use this analysis to determine how price fluctuations will impact their operation. They can assume an expected price and calculate the necessary yield per acre to earn a profit.

<sup>1</sup>Last sold has become a more recent pricing issue in production agriculture wherein various crop protectants are not readily available for purchase and for pricing items no longer sought after by producers.

For risk-averse producers, it is best to assume a lower-than-average price to avoid underestimating the bushels per acre requirement. In the event of a price increase, a producer will benefit from having additional, unexpected profit.

The example below assumes a price of \$11.84 per bushel, as projected by USDA-RMA's Price Discovery tool for conventional soybeans in Arkansas. The operating cost of \$492 from the previous example is used again here.

Before, we solved for the unknown variable, price, but this time we solve for yield:

$$(\text{Yield}_{\text{Breakeven}} \times \$11.84/\text{bu}) = \$492$$

By restructuring the equation again, we find the breakeven yield:

$$\frac{\text{Operating Cost}}{\text{Price}} = \text{Yield}_{\text{Breakeven}} \rightarrow$$
$$\frac{\$492}{\$11.84} = 42 \text{ bu/acre}$$

If expected operating costs per acre are \$492 and the expected price of soybeans is \$11.84 per bushel, then a producer would need, at minimum, to produce 42 bushels per acre to break even. Including fixed costs will increase the total bushels needed to break even but is beneficial for producers looking to avoid risk.

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